Department of Ophthalmology and Visual Sciences
UNIVERSITY OF WISCONSIN
SCHOOL OF MEDICINE AND PUBLIC HEALTH

MACULAR DEGENERATION AND NUTRITION

Presented by Julie Maries, PhD
Professor
Preserving Vision

Things we cannot control:
- Our genes
- Our outside environment
Preserving Vision

Things we can do for ourselves:

- Get medical treatment
- Avoid excessive sunlight
- Don’t smoke
- Eat well
- Be active
- Consider supplements, if needed
Based on research conducted by many, and supported by taxpayers and participants. At UW: ...and collaborators at 8 Universities
Macular Degeneration and Nutrition

The Evidence: **Nutrition Matters**

- **Clinical trials prove nutritional interventions:**
  - Lower risk for chronic diseases that are promoted by processes that also promote poor eye health
    - *high blood pressure or blood sugar, oxidative stress, inflammation*
  - Slow the progression of age-related macular degeneration (AMD): AREDS1 and AREDS2
  - Improve vision *(New, early research)*
If you have AMD: The American Academy of Ophthalmology Recommends this supplement tested in the AREDS 2 Trial:

- Lutein (10 mg) and Zeaxanthin (2 mg) (replaces beta-carotene)
- Vitamin C: 500 mg
- Vitamin E: 400 IU
- Zinc: 80 mg (with 2 mg copper)

Talk with your doctor about whether this supplement or alternatives might be best for you.
The Evidence: Nutrition Matters

- Population studies suggest that healthy diets:
  - Lower chances of having early AMD
  - Work synergistically with physical activity and not smoking
Healthy Diets Lowered Age-Related Macular Degeneration Presence 2 to 3 fold

Percent with Intermediate Macular Degeneration in Women 50-74 years

from CAREDS, Mares et al. 2011, Arch Opthal
A Combination of Healthy Lifestyles: Lowered Estimated Risk for AMD 3-Fold

- Percent with Intermediate Macular Degeneration Among Women 50 to 74 years

- Moderate Exercise: 8-10 hours per week
- Healthy Diet Scores: highest 20%
- Never Smoked

- No Regular Exercise
- Healthy Diet Scores: lowest 20%
- Smoked (more than 8 years)

CAREDS, Mares et al. 2011, Arch Ophthal
Healthy diets and lifestyles lowered estimated risk for AMD associated with high genetic risk

Healthy Life Style Score:

- Nutrient-Rich Diet
- Physical Activity
- Low Lifetime Smoking

*In women with stable diets from CAREDS, Meyers et al., 2015, Ophthalmology
Healthy Diet Patterns

- Mediterranean
- Dietary Approach to Stopping Hypertension (DASH)
- US Dietary Guidelines

% Calories from Saturated Fat

Heart Disease Deaths Per 10,000 People

Finland

US

Crete
Healthy Diet Patterns

- Mediterranean
- Dietary Approach to Stopping Hypertension (DASH)
- US Dietary Guidelines

- Abundant in Fruits and Vegetables
  - Whole
  - 5 to 9 per day (1-3/meal)
- Contain
  - Whole Grains
  - A Daily Variety of Protein Sources
    - Plants (nuts, beans, legume)
    - White Meat, Fish, Eggs, Dairy (> 2/week)
    - Red and Processed meat <2/week
What is a Healthy Diet?

Varied, real food, and plant-food rich

http://nutritionforeyes.Ophth.wisc.edu/
Physical Activity, Sun (mornings)
Some differences in Mediterranean Diets with relevance for AMD

Emphasize higher intake of:
Omega-3 fatty acids
- Long-chain: Fish
- Short-chain: walnuts, olive oil [less]

Greens
Fish/Seafood also Provides other Nutrients related to Healthy Eyes and Lower AMD Risk

- Vitamin D
- B vitamins (especially B$_{12}$)
- Minerals (selenium, zinc)
Greens

- Salads, stewed
- Herbs
- Teas
Lutein and Zeaxanthins

Macular Pigment: In white and blue light

© Max Snodderly, 2002
Macular Degeneration and Nutrition

Most Abundant Carotenoids

- Beta-carotene
- Alpha-carotene
- Beta-cryptoxanthin
- Lycopene
- Lutein/Zeaxanthin
- Mesozeaxanthen
Measurement of Lutein and Zeaxanthin Pigments in the Back of the Eye

“Macular Pigment” - Simple, Non-Invasive
The Carotenoids in Age-Related Eye Disease Study (CAREDS) of the Diet and Vision Study in women (53 to 86 years)

WHI: Annual Follow-Up

1994-98
Observational Study
93,676 women

CAREDS
2001-04
2,005 women

CAREDS 2
2016-2018
674+ Women

- Diet, lifestyles and health histories
- Blood: For nutrient, lipid and genetic information
- Macular pigment density
- Intake: Diet, Supplements
- Photographs of retina and lens
- Vision function tests
- Macular pigment density
- Intake: Diet, Supplements
- More retina imaging
- New vision function tests
2001-2004: Macular pigment was higher in women who…

1. Had **gene variants** for proteins that help us take lutein
   - Into our body
   - Through our blood
   - Into our retina

2. Consumed **Healthy Fats**

3. Had high **Fiber Diets**

@ Max. Snodderly, 2002
2016 – 2018 Early Findings…

Fifteen year increases in macular pigment levels were more common in women who:

• Had low levels ~ fifteen years earlier
• Obtained lutein in AREDS2-type supplements (usually 10-12 mg/day)
• Ate eggs (~ 10 /week)
New Research Findings and Direction:

Macular pigment was higher in women and men who report being breast fed (preliminary)

How much does breastfeeding matter to health of eye (and brain)?
• Infant formulas did not add lutein and zeaxanthin until ~ 2012.
• They are still not routinely added.
RESOURCES
Websites with additional information about diet and eye health:

www.ophth.wisc.edu/dvs
http://maresgroup.ophth.wisc.edu
For information about the content and quality of health and nutritional products, and independent testing of their content

https://www.consumerlab.com
Search for recent December 2018 update: Vision Supplements Review (with Lutein and Zeaxanthin)